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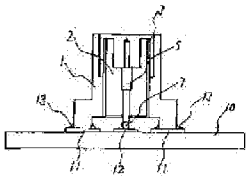
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(54) COAXIAL CONNECTOR



(57)Abstract:

PROBLEM TO BE SOLVED: To provide a coaxial connector of a surface mounting type wherein it can prevent that a center conductor pin damages a

circuit pattern in loading and connection with the circuit pattern can be made stably and flexibly.

SOLUTION: This connector is provided with the first outer conductor 1 in nearly cylindrical state fixed to and connected with a circuit board 10 by soldering and the center conductor pin 5 wherein the center part is retained by an insulator 2 which is arranged at the first outer conductor 1 and in which the second outer conductor 3 is formed at the outer periphery. The center conductor pin 5 has elasticity in a direction perpendicular to the circuit board 10, and a spherically rotating structural body 7 having electroconductivity is installed at the tip of the circuit board 10 side, and this is constituted so that the spherically rotating structural body 7 is contacted and connected with the circuit pattern 12 of the circuit board 10 when loaded to the circuit board 10.

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CLAIMS

[Claim(s)]

[Claim 1] The 1st approximately cylindrical outside by which non-switched connection is carried out to the circuit board with soldering A conductor, In the coaxial connector equipped with the central conductor pin by which the center section was held by the insulator by which it has been arranged inside a conductor the 1st outside of the above, and the conductor was formed in the periphery the 2nd outside the above-mentioned central conductor pin It is the coaxial connector characterized by the above-mentioned spherical rotational-structure object making contact connection with the circuit pattern of the above-mentioned circuit board when a spherical rotational-structure object with conductivity is prepared at the tip by the side of the above-mentioned circuit board and the above-mentioned circuit board is equipped, while having elasticity.

[Claim 2] It is the coaxial connector according to claim 1 characterized by ****ing a conductor the 1st outside of the above and carrying out non-switched connection to the circuit board by the stop.

[Claim 3] The coaxial connector according to claim 1 characterized by having the central conductor pin justification device which makes the above-mentioned

central conductor pin movable free in the direction parallel to the above-mentioned circuit board.

[Claim 4] The 1st lobe which projected [in / the 1st outside of the above / the inner skin of a conductor] the above-mentioned central conductor pin justification device to ledged, and was formed, The 2nd lobe projected and formed [in / the 1st outside of the above / the inner skin near / by the side of the above-mentioned circuit board of a conductor / the edge] in ledged, Prepare the 3rd lobe projected and formed [in / the 2nd outside of the above / the peripheral face of a conductor] in ledged, and the 1st spring is arranged between the 3rd lobe of a conductor the 2nd outside of the 1st lobe of the above of a conductor, and the above the 1st outside of the above. The coaxial connector according to claim 3 characterized by supporting a conductor movable the 2nd outside of the above by the 2nd lobe of the above of a conductor the 1st outside of the above while contacting the edge by the side of the above-mentioned circuit board of a conductor to the 2nd lobe of the above of a conductor the 2nd outside of the above the 1st outside of the above.

[Claim 5] For the above-mentioned central conductor pin, both the other ends are coaxial connectors according to claim 3 characterized by consisting of central conductor pins of ** the 2nd when non-switched connection of the end is carried out to the 1st central conductor pin by which the center section was held at the above-mentioned insulator, and the spherical rotational-structure object was prepared at the tip by the side of the above-mentioned circuit board, and the circuit pattern of the above-mentioned circuit board, and in which the above-mentioned spherical rotational-structure object is making contact connection.

[Claim 6] The above-mentioned spherical rotational-structure object is a coaxial connector according to claim 5 characterized by being prepared at the tip of the central conductor pin of the above 2nd.

[Claim 7] The coaxial connector according to claim 4 characterized by having arranged the 2nd spring further between the 2nd lobe projected and formed [in / the 1st outside of the end face by the side of the above-mentioned circuit board

of a conductor, and the above / the 2nd outside of the above / the inner skin near / above-mentioned / the circuit board side edge section of a conductor] in ledged.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the structure for connecting a central conductor pin to the circuit pattern formed in front faces, such as a printed circuit board, in more detail with respect to the coaxial connector of a surface mount mold which equips substrate front faces, such as a printed circuit board, and transmits a signal.

[0002]

[Description of the Prior Art] Drawing 9 is the sectional view showing the structure of the coaxial connector of the conventional surface mount mold with which the front face of a printed circuit board in which the electronic circuitry etc. was formed is equipped. In drawing, a conductor and 2 the 1st approximately cylindrical outside where 1 becomes a connector body An insulator, The central conductor pin by which, as for a conductor and 5, a center section is held at an

insulator 2 2nd outside the shape of a cylinder by which 3 was formed in the periphery of an insulator 2, The circuit pattern with which, as for 10, a printed circuit board is carried out, and, as for 11, solder (solder) connection of the conductor 1 is made the 1st outside, the circuit pattern with which, as for 12, the soldered joint of the central conductor pin 5 is carried out, and 13 are solder (solder). The conductor 3 and the central conductor pin 5 have integral construction a conductor 1, an insulator 2, and the 2nd outside the 1st outside, and the coaxial connector is constituted. In addition, although not shown in drawing 9 , there is the other party's coaxial connector with which other printed circuit boards or electronic instruments etc. were equipped, and when this other party's coaxial connector and the coaxial connector shown in drawing 9 fit in, transfer of a signal is performed between coaxial connectors.

[0003] Next, the case where a printed circuit board 10 is equipped with the coaxial connector of the conventional surface mount mold with the structure shown in drawing 9 is explained. Soldering paste is beforehand applied to the front face of the circuit pattern 12 to which the circuit pattern 11 and the central conductor pin 5 to which a conductor 1 is connected the 1st outside are connected. And the soldered joint of a conductor 1 and the circuit pattern 11 and the soldered joint of the central conductor pin 5 and the circuit pattern 12 are performed the 1st outside by cooling, after heating in the condition of having used the conductor 1 as the circuit pattern 11, having used alignment of the central conductor pin 5 to the circuit pattern 12 the 1st outside, respectively, and having pressed and carrying out melting of the soldering paste. Non-switched connection of the conventional coaxial connector is carried out to a printed circuit board by such soldering (soldering by the so-called reflow method). In addition, contact connection may be made at the non-switched connection to the printed circuit board of a coaxial connector by other non-switched connection means, such as a **** stop instead of a soldered joint.

[0004]

[Problem(s) to be Solved by the Invention] As mentioned above, in the coaxial

connector of the conventional surface mount mold, since it connected with the circuit pattern of the front face of a printed circuit board with soldering, the central conductor pin had the trouble of changing the transfer characteristics of the RF signal transmitted by change (dispersion) of the amount of solder (solder), or a configuration. Moreover, since it is made to move horizontally (namely, direction parallel to a printed circuit board) in the tip of a central conductor pin, with a circuit pattern contacted in case alignment is performed for a coaxial connector to a printed circuit board A blemish reaches the front face of the circuit pattern connected by the tip of a central conductor pin. There was a trouble of it becoming impossible to change the transfer characteristics of the RF signal transmitted, or to maintain the stable connection between a central conductor pin and a circuit pattern, and it becoming impossible to secure the dependability of a plated circuit pattern according to corrosion generating for a scratch etc.

[0005] Moreover, in the conventional coaxial connector, since non-switched connection of the central conductor pin was carried out to the circuit pattern by soldering, there was no location gap absorption function, for this reason, to the central conductor pin, alignment of the other party's coaxial connector had to be carried out correctly, and it had to be inserted (fitting). Otherwise, when fitting with the other party's coaxial connector was not made or fitting was carried out by force, the trouble that stress concentration occurred was in the installation section of a connector.

[0006] In case it was made in order that this invention might cancel such a trouble, and a printed circuit board is equipped with the coaxial connector of a surface mount mold, while being able to prevent damaging the circuit pattern on the front face of a substrate by the central conductor pin, a central conductor pin aims it at a circuit pattern, stability, and offering the coaxial connector of a connectable surface mount mold flexibly. Moreover, by having the migration device (justification device) of the central conductor pin which can absorb a location gap of the coaxial connector of the other party who fits in, highly precise alignment with the other party's coaxial connector is not needed, but it aims at

offering easily the other party's coaxial connector and the coaxial connector which can be fitted in.

[0007]

[Means for Solving the Problem] The coaxial connector concerning this invention the 1st approximately cylindrical outside by which non-switched connection is carried out to the circuit board with soldering A conductor, In the coaxial connector equipped with the central conductor pin by which the center section was held by the insulator by which it has been arranged inside a conductor the 1st outside, and the conductor was formed in the periphery the 2nd outside the above-mentioned central conductor pin While having elasticity, when a spherical rotational-structure object with conductivity is prepared at the tip by the side of the circuit board and the circuit board is equipped, a spherical rotational-structure object is constituted so that contact connection may be made with the circuit pattern of the circuit board.

[0008] Moreover, 1st outside the coaxial connector concerning this invention, a conductor is ****ed and non-switched connection is carried out to the circuit board by the stop.

[0009] Moreover, the coaxial connector concerning this invention is equipped with the central conductor pin justification device which makes a central conductor pin movable free in the direction parallel to the circuit board.

[0010] Moreover, the central conductor pin justification device of the coaxial connector concerning this invention The 1st lobe projected and formed [in / the 1st outside / the inner skin of a conductor] in ledged, The 2nd lobe projected and formed [in / the 1st outside / the inner skin near / by the side of the circuit board of a conductor / the edge] in ledged, Prepare the 3rd lobe projected and formed [in / the 2nd outside / the peripheral face of a conductor] in ledged, and the 1st spring is arranged between the 3rd lobe of a conductor the 2nd outside with the 1st lobe of a conductor the 1st outside. While contacting the edge by the side of the circuit board of a conductor to the 2nd lobe of a conductor the 2nd outside the 1st outside, a conductor is supported movable the 2nd outside by the 2nd

lobe of a conductor the 1st outside.

[0011] Moreover, a center section is held at an insulator and the central conductor pin of the coaxial connector concerning this invention consists of central conductor pins of ** the 2nd to which the above-mentioned spherical rotational-structure object is making contact connection of both the other ends with which non-switched connection of the end is carried out to the 1st central conductor pin by which the spherical rotational-structure object was prepared at the tip by the side of the circuit board, and the circuit pattern of the circuit board.

[0012] Moreover, the spherical rotational-structure object of the coaxial connector concerning this invention is prepared at the tip of the 2nd central conductor pin.

[0013] Moreover, the coaxial connector concerning this invention arranges the 2nd spring further between the 2nd lobe projected and formed [in / the end face by the side of the above-mentioned circuit board of a conductor, and the 1st outside / the 2nd outside / the inner skin near / above-mentioned / the circuit board side edge section of a conductor] in ledged.

[0014]

[Embodiment of the Invention] Hereafter, the gestalt of 1 operation of this invention is explained based on a drawing. In addition, the same sign as the former expresses a thing the same as that of the conventional thing, or considerable.

Gestalt 1. drawing 1 of operation is the sectional view showing the structure of the coaxial connector of the surface mount mold by the gestalt 1 of operation. In drawing, a conductor and 2 1st outside the shape of a cylindrical shape from which 1 becomes a connector body An insulator, The central conductor pin by which, as for a conductor and 5, the center section was held at the insulator 2 2nd outside the shape of a cylindrical shape by which 3 was formed in the periphery of an insulator 2, A spherical rotational-structure object with the conductivity by which 7 was prepared at the tip of the central conductor pin 5, The circuit pattern with which, as for 10, a printed circuit board (it is also only called the circuit board) is carried out, and, as for 11, the soldered joint of the

conductor 1 is carried out the 1st outside, the circuit pattern in which the spherical rotational-structure object 7 with which 12 was prepared at the tip of the central conductor pin 5 makes contact connection, and 13 are solder (solder). In addition, as installation structure to the tip of the central conductor pin 5 of the spherical rotational-structure object 7, the structure at the tip of a ball-point, the structure of a mechanical personal computer mouse, and the same structure are adopted, for example.

[0015] The central conductor pin 5 by which the conductor 3 and the spherical rotational-structure object 7 were formed a conductor 1, an insulator 2, and the 2nd outside the 1st outside has integral construction, and constitutes the coaxial connector by the gestalt 1 of operation. In addition, the central conductor pin 5 has elasticity and is deformable in a direction perpendicular to a printed circuit board 10. Moreover, drawing 2 is the sectional view showing the example of structure of the coaxial connector by the gestalt 1 of operation shown in drawing 1, and the coaxial connector of the other party who fits in. In drawing, outside, an insulator and 33 are central conductor pins, these are really constituted and, as for 31, the other party's coaxial connector is formed, as for a conductor and 32. Moreover, the circuit pattern of the printed circuit board equipped with the other party's coaxial connector, as for 40 and the printed circuit board 40 to which, as for 41, the soldered joint of the conductor 31 is carried out outside, and 12 are circuit patterns of a printed circuit board 40 with which the soldered joint of the central conductor pin 33 is carried out.

[0016] The edge of the side and the opposite side in which the spherical rotational-structure object 7 of the central conductor pin 5 of the coaxial connector by the gestalt of this operation shown in drawing 1 was formed is inserted (fitting), and the tip of the central conductor pin 33 of the coaxial connector of a partner mold has structure which can carry out elastic contact. As the Prior art explained, also in the other party coaxial connector, soldering paste is beforehand applied to the front face of the circuit pattern 42 to which the circuit pattern 41 and the central conductor pin 33 to which a conductor 31 is connected

outside are connected. And non-switched connection of the other party's coaxial connector is carried out to the printed circuit board 40 by performing the soldered joint of a conductor 31, the circuit pattern 41, and the central conductor pin 33 and the way pattern 42 outside by cooling, after heating in the condition of having used the conductor 31 as the circuit pattern 41, having used alignment of the central conductor pin 33 to the circuit pattern 42 outside, respectively, and having pressed and carrying out melting of the soldering paste.

[0017] in addition, the structure which formed the conductor in the periphery of an insulator 32 the 2nd outside although the conductor was not formed in the periphery of an insulator 32 outside in drawing 2 -- it is -- ** -- a good thing cannot be overemphasized. Moreover, drawing 3 is drawing showing a condition when fitting of the coaxial connector of the other party who showed drawing 2 is carried out to the coaxial connector by the gestalt of this operation shown in drawing 1 .

[0018] Next, the case where a printed circuit board 10 is equipped with the coaxial connector by the gestalt 1 of operation with the structure shown in drawing 1 (mounting) is explained. Soldering paste is not applied to the front face of the circuit pattern 12 with which the spherical rotational-structure object 7 prepared at the tip of the central conductor pin 5 contacts although soldering paste is beforehand applied to the front face of the circuit pattern 11 of a printed circuit board 10 to which a conductor 1 is connected the 1st outside. And it heats, where it carried out alignment of the spherical rotational-structure object 7 in which the conductor 1 was formed by the circuit pattern 11 at the tip of the central conductor pin 5 the 1st outside again to the circuit pattern 12, respectively and it is pressed, and it cools, after carrying out melting of the soldering paste applied to the front face of the circuit pattern 11. Thereby, while the soldered joint of a conductor 1 and the circuit pattern 11 is performed the 1st outside, the spherical rotational-structure object 7 with the conductivity established at the tip of the central conductor pin 5 carries out elastic contact, and is connected to the circuit pattern 12.

[0019] In the coaxial connector by the gestalt 1 of the operation which adopted such structure, since connection of the central conductor pin 5 and the plated circuit pattern 12 is not soldering but elastic contact through the spherical rotational-structure object 7, it can lose fluctuation of the RF signal transfer characteristics resulting from a solder configuration difference (namely, dispersion of the amount of solder when carry out the soldered joint of the central conductor pin 5 and the circuit pattern 12, or a configuration) like before.

Moreover, by having had the spherical rotational-structure object 7 at the tip of the central conductor pin 5 with elasticity Since the rotational-structure object 7 rotates smoothly where the front face of the circuit pattern 12 is contacted certainly in case alignment of the coaxial connector is carried out to the circuit patterns 11 and 12 on a printed circuit board 10 Damaging the front face of the circuit pattern 12 at the tip of the central conductor pin 5 like before is lost, and the coaxial connector from which stability and reliable connection are obtained between the central conductor pin 5 and the circuit pattern 12 can be realized.

[0020] Gestalt 2. drawing 4 of operation is the sectional view showing the structure of the coaxial connector by the gestalt 2 of operation. In drawing, the hole which the tapped hole where 14 was prepared in the pars basilaris ossis occipitalis of a conductor 1 the 1st outside, and 15 are prepared in a printed circuit board 10, and **** penetrates, and 16 are ****. In addition, the same sign as drawing 1 expresses equivalent to the thing of drawing 1 , or a corresponding thing. Although the coaxial connector by the gestalt 1 of the above-mentioned operation showed the thing of the structure with which a printed circuit board 10 is equipped by soldering a conductor 1 and the circuit pattern 11 of a printed circuit board 10 the 1st outside The coaxial connector by the gestalt of this operation is set at the pars basilaris ossis occipitalis of a conductor 1 the 1st outside, as shown in drawing 4 . the ledged lobe greatly jutted out over that periphery section -- preparing -- this ledged flare appearance -- a tapped hole 14 is established in a lobe two or more places the bottom -- both Make two or more of these tapped holes 14 correspond, respectively, and two or more holes 15 are

established also in a printed circuit board 10. It is characterized by connecting a conductor 1 and the circuit pattern 11 of a printed circuit board 10 the 1st outside by ****ing a conductor 1 and a printed circuit board 10 the 1st outside with a screw thread 16, and carrying out stop immobilization.

[0021] Thereby, since it becomes unnecessary further soldering it while the central conductor pin 5 is carrying out elastic contact in the condition of having been stabilized to the circuit pattern 12 on a printed circuit board 10 through the spherical rotational-structure object 7 with conductivity and does so the same effectiveness as the coaxial connector by the gestalt 1 of operation mentioned above, the coaxial connector by the gestalt of this operation can also aim at an improvement of workability.

[0022] Gestalt 3. drawing 5 of operation is the sectional view showing the structure of the coaxial connector by the gestalt 3 of operation. In drawing, they are the lobe of **** 1 which projected 1a to ledged in the inner skin of a conductor 1 the 1st outside which carried out the shape of a cylindrical shape, and was formed, and the lobe of **** 2 which projected [in / the 1st outside / the inner circumference section near the pars basilaris ossis occipitalis (the printed-circuit-board side edge section of a conductor 1 near / Namely, 1st besides /) of a conductor 1] 1b to ledged, and was formed. Moreover, 3 is a conductor the cylindrical shape-like 2nd outside, and 3a is the 3rd lobe projected and prepared [in / the 2nd outside / the periphery section of a conductor 3] in ledged. Moreover, 8 is the 1st spring (spring) arranged between 3rd lobe 3a of a conductor 3 1st lobe 1a of a conductor 1, and the 2nd outside the 1st outside. In addition, the same sign as drawing 1 which shows the structure of the coaxial connector by the gestalt 1 of operation expresses a thing equivalent to the thing of drawing 1 , or considerable.

[0023] As shown in drawing 5 , the pars basilaris ossis occipitalis (namely, 2nd besides edge by the side of the printed circuit board of a conductor) of a conductor 3 is supported by 2nd lobe 1b formed in the inner circumference section near the pars basilaris ossis occipitalis of a conductor 1 the 1st outside

the 2nd outside used as the central conductor pin 5 and an insulator 2, and integral construction. Like the case of the coaxial connector by the gestalt 1 of operation, non-switched connection of the conductor 1 is carried out to the circuit pattern 11 on a printed circuit board 10 with solder 13 the 1st outside, and the central conductor pin 5 is connected to the circuit pattern 12 on a printed circuit board 10 by elastic contact through the spherical rotational-structure object 7 attached at the tip.

[0024] Next, the characteristic structure and the actuation of a coaxial connector by the gestalt 3 of this operation are explained. the center section of the central conductor pin 5 is held with an insulator 2 -- both, the conductor 3 is formed in the periphery of an insulator 2 the cylindrical shape-like 2nd outside, and the conductor 3, the insulator 2, and the central conductor pin 5 have integral construction the 2nd outside. The 2nd outside used as an insulator 2 and the central conductor pin 5, and integral construction and a conductor 3 Maintaining elastic contact between the top faces of 2nd lobe 1b of a conductor 1 the 1st outside with the pars basilaris ossis occipitalis of a conductor 3 the 2nd outside according to an operation of the 1st Spring-8 inside a conductor 1 the 1st outside It is supported by 2nd lobe 1b of a conductor 1 the 1st outside, and has structure which can move in the parallel direction free to a printed circuit board 10.

[0025] In the coaxial connector by the gestalt of this operation which adopted such structure (namely, central conductor pin justification device), in case it fits in with the other party coaxial connector, even if the location of the other party's coaxial connector shifts in the direction parallel to the substrate front face of a printed circuit board 10 somewhat, a conductor 3, an insulator 2, and the central conductor pin 5 can be united the 2nd outside, and it can move in the direction parallel to the substrate front face of a printed circuit board 10, and can fit in easily with the other party's coaxial connector. Moreover, the central conductor pin 5 can be moved in the direction parallel to the substrate front face of a printed circuit board 10, with the stable contact maintained, without damaging the front face of the circuit pattern 12 on a printed circuit board 10, since it has the

spherical rotational-structure object 7 with conductivity at the tip of the central conductor pin 5 with elasticity in case the central conductor pin 5 moves in the direction parallel to the substrate front face of a printed circuit board 10 at the time of the fitting. Moreover, even if a conductor 3 moves in the direction parallel to the substrate front face of a printed circuit board 10 the 2nd outside, since the conductor 3 is always maintaining elastic contact a conductor 1 and the 2nd outside the 1st outside, connection with the stable high dependability without transfer-characteristics fluctuation of a RF signal is attained.

[0026] Gestalt 4. drawing 6 of operation is the sectional view showing the structure of the coaxial connector by the gestalt 4 of operation. In drawing, they are the 1st lobe which projected 1a to ledged in the inner skin of a conductor 1 the 1st outside which carried out the shape of a cylindrical shape, and was prepared, and the 2nd lobe which projected [in / the 1st outside / the inner circumference section near the pars basilaris ossis occipitalis of a conductor 1] 1b to ledged, and was prepared. Moreover, 3 is a conductor the cylindrical shape-like 2nd outside, and 3a is the 3rd lobe projected and prepared [in / the 2nd outside / the periphery section of a conductor 3] in ledged. Moreover, 8 is the 1st spring arranged between 3rd lobe 3a of a conductor 3 1st lobe 1a of a conductor 1, and the 2nd outside the 1st outside. Moreover, the 1st central conductor pin by which the spherical rotational-structure object 7 with [in 51] conductivity to the tip is formed, and 52 are 2nd central conductor pin by which the soldered joint is carried out to the circuit pattern 12 of a printed circuit board 10. In addition, the same sign as drawing 5 which shows the structure of the coaxial connector by the gestalt 3 of operation expresses a thing equivalent to the thing of drawing 5 , or considerable.

[0027] Next, the characteristic structure and the actuation of a coaxial connector by the gestalt of this operation are explained. The 1st central conductor pin 51 has a conductor 3 and integral construction an insulator 2 and the 2nd outside, and the spherical rotational-structure object 7 is formed at the tip. Moreover, the soldered joint of the end is carried out to the circuit pattern 12 of a printed circuit

board 10, and, as for the 2nd central conductor pin 52, contact connection of the spherical rotational-structure object 7 with which the other end was prepared at the tip of the 1st central conductor pin 51 is made. That is, the 1st central conductor pin 51 and the 2nd central conductor pin 52 have structure which maintains elastic contact through the spherical rotational-structure object 7 with the conductivity attached at the tip of the 1st central conductor pin 51. Like the case of the gestalt 3 of operation, the 2nd outside used as an insulator 2 and the 1st central conductor pin 51, and integral construction and a conductor 3 the 1st outside -- a conductor -- it has structure which can move in the parallel direction free to the front face of a printed circuit board 10, maintaining elastic contact between the top faces of lobe 1b of a conductor 1 the 1st outside with the pars basilaris ossis occipitalis of a conductor 3 the 2nd outside according to an operation of the 1st Spring-8 in the 1 interior.

[0028] In the coaxial connector by the gestalt of this operation with such structure, even if the location of the coaxial connector of the other party who fits in shifts in the direction parallel to the front face of a printed circuit board 10 somewhat, a conductor 3, an insulator 2, and the 1st central conductor pin 51 can be united the 2nd outside, and it can move in the direction parallel to the front face of a printed circuit board 10, and can fit in with the other party's coaxial connector. Moreover, since the spherical rotational-structure object 7 is formed at the tip of the 1st central conductor pin 51 in case the 1st central conductor pin 51 moves in the direction parallel to the front face of a printed circuit board 10 at the time of the fitting, the 1st central conductor pin 51 can be moved in the direction parallel to the front face of a printed circuit board 10, with the 2nd central conductor pin 52 and the stable contact maintained. Moreover, when it fits in with the other party's coaxial connector, even if the 1st central conductor pin 51 which has a conductor 3 and integral construction the 2nd outside moves in the direction parallel to the front face of a printed circuit board 10 Since non-switched connection of the 2nd central conductor pin 52 is carried out to the circuit pattern 12 of a printed circuit board 10 The distance between conductors 1 does not

change the 2nd central conductor pin 52 and the 1st outside, but transfer-characteristics fluctuation of a RF signal becomes less than the case of the gestalt 3 of operation, and connection with the high dependability stabilized further is attained.

[0029] Gestalt 5. drawing 7 of implementation of invention is the sectional view showing the structure of the coaxial connector by the gestalt 5 of operation. Although the coaxial connector by the gestalt 4 of the above-mentioned operation showed the thing of the structure which attaches the spherical rotational-structure object 7 at the tip of the 1st central conductor pin 51, and makes contact connection with the 2nd central conductor 52 In the coaxial connector by the gestalt of this operation, the spherical rotational-structure object 7 with conductivity is attached at the tip of the 2nd central conductor pin 52, and it considers as the structure which makes contact connection with the 1st [with elasticity] central conductor pin 51 perpendicularly. Since other structures are the same as a coaxial connector in the gestalt 4 of operation, explanation is omitted. It is effective in the components manufacture inside a connector becoming easy by having considered as the structure of attaching a spherical rotational-structure object at the tip of the 2nd central conductor pin and to say nothing of the coaxial connector by the gestalt of this operation doing so the same effectiveness as the gestalt 5 of the above-mentioned operation.

[0030] Gestalt 6. drawing 8 of operation is the sectional view showing the structure of the coaxial connector by the gestalt 6 of operation. In drawing, 9 is the 2nd spring arranged between the partes basilaris ossis occipitalis of a conductor 3 2nd lobe 1a of a conductor 1, and the 2nd outside the 1st outside. In addition, the same sign as drawing 5 which shows the structure of the coaxial connector by the gestalt 3 of operation expresses a thing equivalent to the thing of drawing 5 , or considerable.

[0031] In the coaxial connector according [the coaxial connector by the gestalt of this operation] to the gestalt 3 of operation By furthermore forming the 2nd spring 9 between the partes basilaris ossis occipitalis of a conductor 3 2nd lobe

1a of a conductor 1, and the 2nd outside the 1st outside. If the other party's coaxial connector which is not illustrated at the time of fitting is inserted. A conductor 3, an insulator 2, and the central conductor pin 5 are depressed below (direction which goes to a printed circuit board 10) by frictional force the 2nd outside used as integral construction. When the spherical rotational-structure object 7 contacts the circuit pattern 12 of a printed circuit board 10 and inserts the other party's coaxial connector further, it fits in certainly with the other party's coaxial connector. Moreover, when the other party's coaxial connector has not fitted in, as shown in drawing 8, the spherical rotational-structure object 7 and the circuit pattern 12 have not made contact connection.

[0032] In the case of the coaxial connector by the gestalt 3 of operation, although the pars basilaris ossis occipitalis of a conductor 3 was carrying out field contact 2nd lobe 1b of a conductor 1, and the 2nd outside the 1st outside, in the coaxial connector by the gestalt of this operation, contact at the pars basilaris ossis occipitalis of a conductor 3 is only the 2nd spring 9 2nd lobe 1b of a conductor 1, and the 2nd outside the 1st outside, and field contact has not been carried out. Therefore, the 1st outside at the time of fitting in in the condition that the other party's coaxial connector has shifted in the direction parallel to the front face of a printed circuit board 10, the contact frictional force with the pars basilaris ossis occipitalis of a conductor 3 becomes small compared with the case of the coaxial connector according to the gestalt 3 of operation 2nd lobe 1b of a conductor 1, and the 2nd outside, and fitting can perform it still more easily.

[0033]

[Effect of the Invention] According to the coaxial connector concerning this invention, the 1st approximately cylindrical outside by which non-switched connection is carried out to the circuit board with soldering. A conductor, In the coaxial connector equipped with the central conductor pin by which the center section was held by the insulator by which it has been arranged inside a conductor the 1st outside, and the conductor was formed in the periphery the 2nd outside the above-mentioned central conductor pin. Since the spherical rotational-

structure object was constituted so that contact connection might be made with the circuit pattern of the circuit board when a spherical rotational-structure object with conductivity was prepared at the tip by the side of the circuit board and the circuit board was equipped, while having elasticity While fluctuation of the RF signal transfer characteristics resulting from the difference in the solder configuration in the soldered joint of a central conductor pin and a circuit pattern is lost It becomes without damaging the front face of a circuit pattern at the tip of a central conductor pin, and stability and reliable connection are obtained between a central conductor pin and a circuit pattern.

[0034] Moreover, since according to the coaxial connector concerning this invention a conductor is ****ed the 1st outside and non-switched connection is carried out to the circuit board by the stop, while stability and reliable connection are obtained between a central conductor pin and a circuit pattern, soldering becomes unnecessary further and an improvement of workability can be aimed at.

[0035] Moreover, since it had the central conductor pin justification device which makes a central conductor pin movable free in the direction parallel to the circuit board according to the coaxial connector concerning this invention, while stability and reliable connection are obtained between a central conductor pin and a circuit pattern, even if the location of the other party's coaxial connector shifts somewhat, it can fit in easily with the other party's coaxial connector.

[0036] According to the coaxial connector concerning this invention, moreover, a central conductor pin justification device The 1st lobe projected and formed [in / the 1st outside / the inner skin of a conductor] in ledged, The 2nd lobe projected and formed [in / the 1st outside / the inner skin near the circuit board side edge section of a conductor] in ledged, Prepare the 3rd lobe projected and formed [in / the 2nd outside / the peripheral face of a conductor] in ledged, and the 1st spring is arranged between the 3rd lobe of a conductor the 2nd outside with the 1st lobe of a conductor the 1st outside. While contacting the edge by the side of the circuit board of a conductor to the 2nd lobe of a conductor the 2nd outside

the 1st outside Since the conductor was supported movable the 2nd outside by the 2nd lobe of a conductor the 1st outside While easy structure can realize a central conductor pin justification device and stability and reliable connection are obtained between a central conductor pin and a circuit pattern, even if the location of the other party's coaxial connector shifts somewhat, it can fit in easily with the other party's coaxial connector.

[0037] According to the coaxial connector concerning this invention, moreover, a central conductor pin The 1st central conductor pin by which the center section was held at the insulator and the spherical rotational-structure object was prepared at the tip by the side of the circuit board, Since it consisted of central conductor pins of ** the 2nd to which the above-mentioned spherical rotational-structure object is making contact connection of both the other ends with which non-switched connection of the end is carried out to the circuit pattern of the circuit board Even if it fits in with the other party's coaxial connector and the location of the 1st central conductor pin moves somewhat, the distance between conductors does not change the 2nd central conductor pin and the 1st outside, but transfer-characteristics fluctuation of a RF signal decreases, and connection with the high dependability stabilized further is attained.

[0038] Moreover, according to the coaxial connector concerning this invention, since the spherical rotational-structure object was prepared at the tip of the 2nd central conductor pin, the distance between conductors does not change the 2nd central conductor pin and the 1st outside, but while connection with the stable high dependability is attained, the components manufacture inside a connector becomes easy.

[0039] Moreover, since the 2nd spring has been further arranged between the 2nd lobe projected and formed [in / the end face by the side of the above-mentioned circuit board of a conductor, and the 1st outside / the 2nd outside / the inner skin near / above-mentioned / the circuit board side edge section of a conductor] in ledged according to the coaxial connector concerning this invention The contact frictional force with the pars basilaris ossis occipitalis of a

conductor 3 becomes small the 2nd lobe of a conductor, and the 2nd outside the 1st outside, and fitting can carry out still more easily.

[Translation done.]

* NOTICES *

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3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing the structure of the coaxial connector by the gestalt 1 of operation.

[Drawing 2] It is the sectional view showing the example of structure of the other party coaxial connector which fits in.

[Drawing 3] It is the sectional view showing a condition when the coaxial connector by the gestalt 1 of operation fits in with the other party's coaxial connector.

[Drawing 4] It is the sectional view showing the structure of the coaxial connector by the gestalt 2 of operation.

[Drawing 5] It is the sectional view showing the structure of the coaxial connector by the gestalt 3 of operation.

[Drawing 6] It is the sectional view showing the structure of the coaxial connector by the gestalt 4 of operation.

[Drawing 7] It is the sectional view showing the structure of the coaxial connector by the gestalt 5 of operation.

[Drawing 8] It is the sectional view showing the structure of the coaxial connector by the gestalt 6 of operation.

[Drawing 9] It is the sectional view showing the structure of the conventional coaxial connector.

[Description of Notations]

1 It is Conductor 1st Outside. 1a 1st Lobe

1b 2nd lobe 2 Insulator

3 It is Conductor 2nd Outside. 3a 3rd Lobe

5 Central Conductor Pin 7 Spherical Rotational-Structure Object

8 1st Spring 9 2nd Spring

10 Printed Circuit Board

11 Circuit Pattern to which Conductor is Connected 1st Outside

12 Circuit Pattern to which Conductor is Connected 2nd Outside

13 Solder 14 Tapped Hole

15 Hole of Printed Circuit Board 16 ****

51 1st Central Conductor Pin 51 2nd Central Conductor Pin

[Translation done.]

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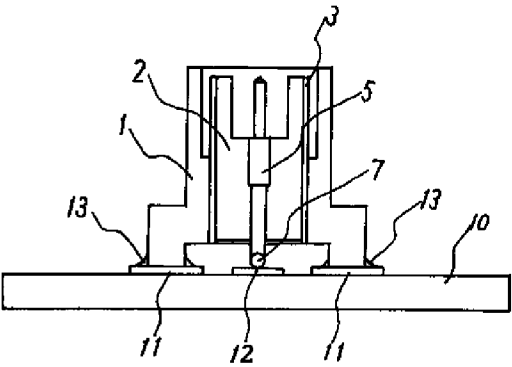
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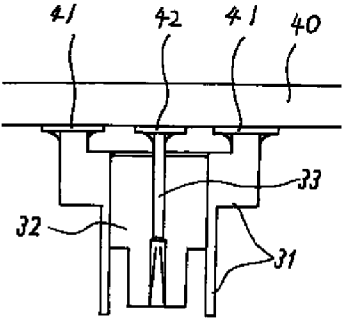
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DRAWINGS

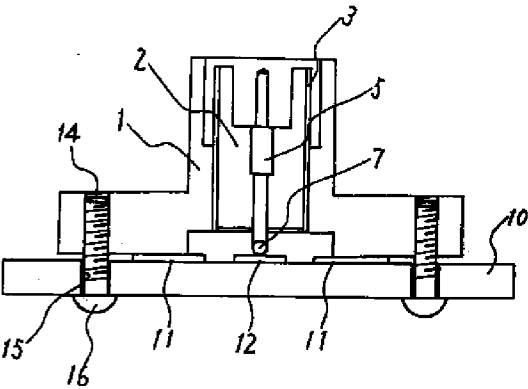
[Drawing 1]



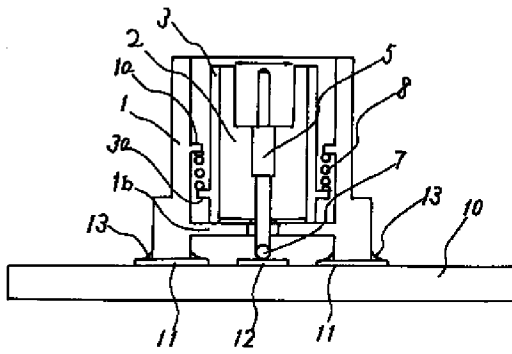
[Drawing 2]



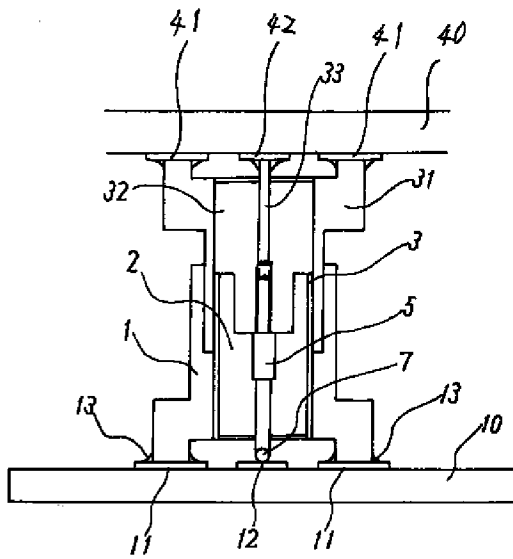
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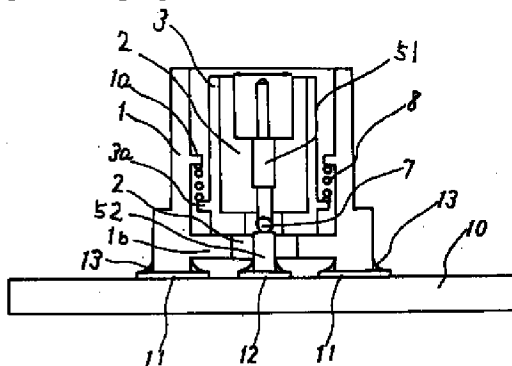
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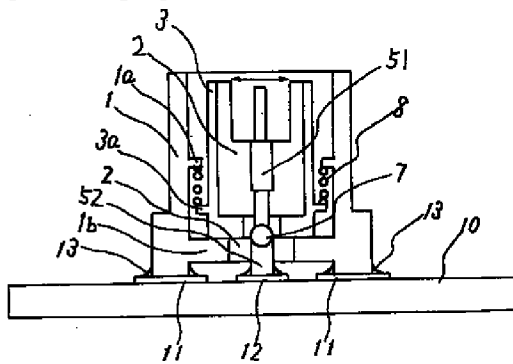
[Drawing 3]



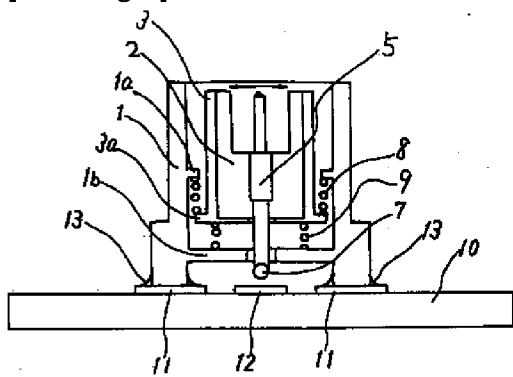
[Drawing 6]



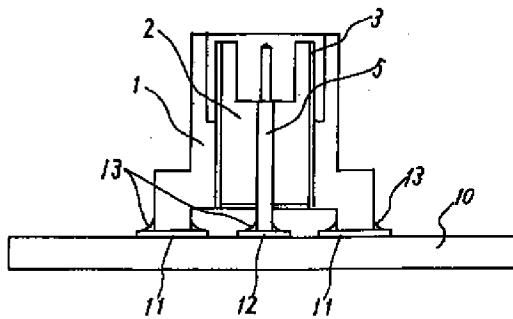
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]

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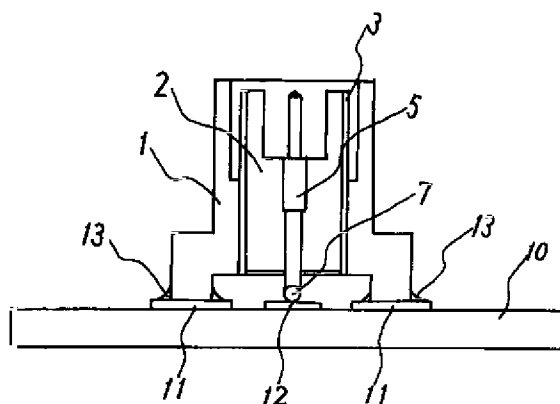
HH19

(54)【発明の名称】 同軸コネクタ

(57)【要約】

【課題】 装着する際に、中心導体ピンが回路パターンを傷つけることを防止できると共に、回路パターンと安定かつフレキシブルに接続できる表面実装型の同軸コネクタを提供する。

【解決手段】 回路基板10にはんだ付けにより固定接続される略円筒状の第1の外導体1と、第1の外導体1の内部に配置され、外周に第2の外導体3が形成された絶縁体2によって中央部が保持された中心導体ピン5とを備え、中心導体ピン5は、回路基板10と垂直方向に弾性を有していると共に回路基板10側の先端に導電性を有した球状回転構造物7が設けられ、回路基板10に装着されたときに、球状回転構造物7が回路基板10の回路パターン12と接触接続するように構成する。



【特許請求の範囲】

【請求項1】 回路基板にはんだ付けにより固定接続される略円筒状の第1の外導体と、上記第1の外導体の内部に配置され、外周に第2の外導体が形成された絶縁体によって中央部が保持された中心導体ピンとを備えた同軸コネクタにおいて、

上記中心導体ピンは、弾性を有していると共に、上記回路基板側の先端に導電性を有した球状回転構造物が設けられ、上記回路基板に装着されたときに、上記球状回転構造物は上記回路基板の回路パターンと接触接続することを特徴とする同軸コネクタ。

【請求項2】 上記第1の外導体は、ねじ止めによって回路基板に固定接続されることを特徴とする請求項1に記載の同軸コネクタ。

【請求項3】 上記中心導体ピンを上記回路基板と平行な方向に自在に移動可能とする中心導体ピン位置調整機構を備えたことを特徴とする請求項1に記載の同軸コネクタ。

【請求項4】 上記中心導体ピン位置調整機構は、上記第1の外導体の内周面において棚状に突出して形成された第1の突出部と、上記第1の外導体の上記回路基板側の端部近傍の内周面において棚状に突出して形成された第2の突出部と、上記第2の外導体の外周面において棚状に突出して形成された第3の突出部とを設け、上記第1の外導体の上記第1の突出部と上記第2の外導体の第3の突出部との間に第1のスプリングを配置して、上記第1の外導体の上記第2の突出部に上記第2の外導体の上記回路基板側の端部を接触させると共に、上記第1の外導体の上記第2の突出部により上記第2の外導体を移動可能に支持したことを特徴とする請求項3に記載の同軸コネクタ。

【請求項5】 上記中心導体ピンは、上記絶縁体に中央部が保持され、上記回路基板側の先端に球状回転構造物が設けられた第1の中心導体ピンと、上記回路基板の回路パターンに一端が固定接続される共に、他端は上記球状回転構造物が接触接続している第2の中心導体ピンとで構成されていることを特徴とする請求項3に記載の同軸コネクタ。

【請求項6】 上記球状回転構造物は、上記第2の中心導体ピンの先端に設けられていることを特徴とする請求項5に記載の同軸コネクタ。

【請求項7】 上記第2の外導体の上記回路基板側の端面と上記第1の外導体の上記回路基板側端部近傍の内周面において棚状に突出して形成された第2の突出部との間に第2のスプリングをさらに配置したことを特徴とする請求項4に記載の同軸コネクタ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、プリント回路基板等の基板表面に装着して信号を伝達する表面実装型の同

軸コネクタに係わり、さらに詳しくは、中心導体ピンをプリント回路基板等の表面に形成された回路パターンに接続させるための構造に関する。

【0002】

【従来の技術】 図9は、電子回路などが形成されたプリント回路基板の表面に装着する従来の表面実装型の同軸コネクタの構造を示す断面図である。図において、1はコネクタ本体となる略円筒状の第1の外導体、2は絶縁体、3は絶縁体2の外周に形成された円筒状の第2の外導体、5は絶縁体2に中央部が保持される中心導体ピン、10はプリント回路基板、11は第1の外導体1がはんだ（半田）接続される回路パターン、12は中心導体ピン5がはんだ接続される回路パターン、13ははんだ（半田）である。第1の外導体1、絶縁体2、第2の外導体3および中心導体ピン5は一体構造となっており、同軸コネクタを構成している。尚、図9には示されていないが、他のプリント回路基板あるいは電子装置などに装着された相手方の同軸コネクタがあり、この相手方の同軸コネクタと図9には示した同軸コネクタとが嵌合することにより、同軸コネクタ間で信号の伝達が行われる。

【0003】 次に、図9に示した構造を有した従来の表面実装型の同軸コネクタをプリント回路基板10に装着する場合について説明する。第1の外導体1が接続される回路パターン11および中心導体ピン5が接続される回路パターン12の表面には、予めはんだペーストが塗布されている。そして、第1の外導体1を回路パターン11に、中心導体ピン5を回路パターン12にそれぞれ位置合わせして押圧した状態で加熱し、はんだペーストを溶融させた後に冷却することによって、第1の外導体1と回路パターン11のはんだ接続および中心導体ピン5と回路パターン12のはんだ接続を行う。このようなはんだ付け作業（いわゆるリフロー方式によるはんだ付け作業）により、従来の同軸コネクタはプリント回路基板に固定接続される。尚、同軸コネクタのプリント回路基板への固定接続には、はんだ接続ではなく、ねじ止め等の他の固定接続手段により接触接続される場合もある。

【0004】

【発明が解決しようとする課題】 以上のように、従来の表面実装型の同軸コネクタでは、その中心導体ピンはプリント回路基板の表面の回路パターンにはんだ付けにより接続されるため、はんだ（半田）の量や形状の変化（ばらつき）により、伝送される高周波信号の伝達特性が変動してしまうという問題点があった。また、同軸コネクタをプリント回路基板に対して位置合わせを行う際に、中心導体ピンの先端を回路パターンに接触したまま水平方向（即ち、プリント回路基板に平行な方向）に移動させることになるので、中心導体ピンの先端によって接続される回路パターンの表面に傷がつき、伝送され

る高周波信号の伝達特性が変動したり、中心導体ピンと回路パターンとの安定した接続が保てなくなったり、あるいは傷部分の腐食発生等により基板回路パターンの信頼性が確保できなくなるという問題点があった。

【0005】また、従来の同軸コネクタでは、中心導体ピンは回路パターンにはんだ付けによって固定接続されているので、位置ずれ吸収機能がなく、このため、相手方の同軸コネクタは中心導体ピンに対して正確に位置合わせして挿入（嵌合）しなければならなかった。さもなければ、相手方の同軸コネクタとの嵌合ができなかったり、あるいは、無理に嵌合させるとコネクタの取り付け部に応力集中が発生するという問題点があった。

【0006】本発明は、このような問題点を解消するためになされたもので、表面実装型の同軸コネクタをプリント回路基板に装着する際に、中心導体ピンにより基板表面の回路パターンを傷つけることを防止できると共に、中心導体ピンが回路パターンと安定かつフレキシブルに接続が可能な表面実装型の同軸コネクタを提供することを目的とする。また、嵌合する相手方の同軸コネクタの位置ずれを吸収できる中心導体ピンの移動機構（位置調整機構）を備えることにより、相手方の同軸コネクタとの高精度な位置合わせを必要とせず、容易に相手方の同軸コネクタと嵌合可能な同軸コネクタを提供することを目的とする。

【0007】

【課題を解決するための手段】本発明に係る同軸コネクタは、回路基板にはんだ付けにより固定接続される略円筒状の第1の外導体と、第1の外導体の内部に配置され、外周に第2の外導体が形成された絶縁体によって中央部が保持された中心導体ピンとを備えた同軸コネクタにおいて、上記中心導体ピンは、弾性を有していると共に、回路基板側の先端に導電性を有した球状回転構造物が設けられ、回路基板に装着されたときに、球状回転構造物は回路基板の回路パターンと接触接続するように構成したものである。

【0008】また、本発明に係る同軸コネクタの第1の外導体は、ねじ止めによって回路基板に固定接続されるものである。

【0009】また、本発明に係る同軸コネクタは、中心導体ピンを回路基板と平行な方向に自在に移動可能とする中心導体ピン位置調整機構を備えたものである。

【0010】また、本発明に係る同軸コネクタの中心導体ピン位置調整機構は、第1の外導体の内周面において棚状に突出して形成された第1の突出部と、第1の外導体の回路基板側の端部近傍の内周面において棚状に突出して形成された第2の突出部と、第2の外導体の外周面において棚状に突出して形成された第3の突出部とを設け、第1の外導体の第1の突出部と第2の外導体の第3の突出部との間に第1のスプリングを配置して、第1の外導体の第2の突出部に第2の外導体の回路基板側の端

部を接触させると共に、第1の外導体の第2の突出部により第2の外導体を移動可能に支持したものである。

【0011】また、本発明に係る同軸コネクタの中心導体ピンは、絶縁体に中央部が保持され、回路基板側の先端に球状回転構造物が設けられた第1の中心導体ピンと、回路基板の回路パターンに一端が固定接続される共に、他端は上記球状回転構造物が接触接続している第2の中心導体ピンとで構成されたものである。

【0012】また、本発明に係る同軸コネクタの球状回転構造物は、第2の中心導体ピンの先端に設けられたものである。

【0013】また、本発明に係る同軸コネクタは、第2の外導体の上記回路基板側の端面と第1の外導体の上記回路基板側端部近傍の内周面において棚状に突出して形成された第2の突出部との間に第2のスプリングをさらに配置したものである。

【0014】

【発明の実施の形態】以下、図面に基づいて本発明の一実施の形態について説明する。尚、従来と同一符号は従来のもものと同一あるいは相当のものを表す。

実施の形態1. 図1は、実施の形態1による表面実装型の同軸コネクタの構造を示す断面図である。図において、1はコネクタ本体となる略円筒形状の第1の外導体、2は絶縁体、3は絶縁体2の外周に形成された円筒形状の第2の外導体、5は絶縁体2に中央部が保持された中心導体ピン、7は中心導体ピン5の先端に設けられた導電性を有した球状回転構造物、10はプリント回路基板（単に、回路基板とも称す）、11は第1の外導体1がはんだ接続される回路パターン、12は中心導体ピン5の先端に設けられた球状回転構造物7が接触接続する回路パターン、13ははんだ（半田）である。尚、球状回転構造物7の中心導体ピン5の先端への取り付け構造としては、例えばボールペン先端の構造や機械式のパソコンマウスの構造と同様の構造が採用される。

【0015】第1の外導体1、絶縁体2、第2の外導体3および球状回転構造物7が設けられた中心導体ピン5は一体構造となっており、実施の形態1による同軸コネクタを構成している。尚、中心導体ピン5は弾性を有しており、プリント回路基板10と垂直な方向に変形可能である。また、図2は、図1に示した実施の形態1による同軸コネクタと嵌合する相手方の同軸コネクタの構造例を示す断面図である。図において、31は外導体、32は絶縁体、33は中心導体ピンであり、これらが一体構成されて相手方の同軸コネクタが形成されている。また、40は相手方の同軸コネクタが装着されるプリント回路基板、41は外導体31がはんだ接続されるプリント回路基板40の回路パターン、12は中心導体ピン33がはんだ接続されるプリント回路基板40の回路パターンである。

【0016】相手型の同軸コネクタの中心導体ピン33

の先端は、図1に示した本実施の形態による同軸コネクタの中心導体ピン5の球状回転構造物7が設けられた側と反対側の端部が挿入（嵌合）されて、弾性接触できる構造となっている。従来の技術で説明したように、相手方同軸コネクタにおいても、外導体31が接続される回路パターン41および中心導体ピン33が接続される回路パターン42の表面には、予めはんだペーストが塗布されている。そして、外導体31を回路パターン41に、中心導体ピン33を回路パターン42にそれぞれ位置合わせして押圧した状態で加熱し、はんだペーストを溶融させた後に冷却することにより、外導体31と回路パターン41および中心導体ピン33と回路パターン42のはんだ接続が行われることにより、相手方の同軸コネクタはプリント回路基板40に固定接続されている。

【0017】尚、図2では絶縁体32の外周には外導体が形成されていないが、絶縁体32の外周に第2の外導体を形成した構造であってもよいことは言うまでもない。また、図3は、図1に示した本実施の形態による同軸コネクタに図2に示した相手方の同軸コネクタが嵌合されたときの状態を示す図である。

【0018】次に、図1に示した構造を有した実施の形態1による同軸コネクタをプリント回路基板10に装着（実装）する場合について説明する。第1の外導体1が接続されるプリント回路基板10の回路パターン11の表面には、予めはんだペーストが塗布されているが、中心導体ピン5の先端に設けられた球状回転構造物7が接触する回路パターン12の表面には、はんだペーストは塗布されていない。そして、第1の外導体1を回路パターン11に、また、中心導体ピン5の先端に設けられた球状回転構造物7を回路パターン12にそれぞれ位置合わせして押圧した状態で加熱し、回路パターン11の表面に塗布されているはんだペーストを溶融させた後に冷却する。これにより、第1の外導体1と回路パターン11のはんだ接続が行われると共に、中心導体ピン5の先端に設けられた導電性を有した球状回転構造物7は回路パターン12に弾性接触して接続される。

【0019】このような構造を採用した実施の形態1による同軸コネクタにおいては、中心導体ピン5と基板回路パターン12の接続ははんだ付けでなく、球状回転構造物7を介した弾性接触であるため、従来のようなはんだ形状差異（即ち、中心導体ピン5と回路パターン12とをはんだ接続した時のはんだ量や形状のばらつき）に起因する高周波信号伝達特性の変動をなくすることができる。また、弾性を有した中心導体ピン5の先端に球状回転構造物7を備えたことにより、同軸コネクタをプリント回路基板10上の回路パターン11および12に位置合わせする際に、回転構造物7は回路パターン12の表面に確実に接触した状態でスムーズに回転移動するので、従来のように中心導体ピン5の先端で回路パターン12の表面を傷つけることはなくなり、中心導体ピン5

と回路パターン12の間において安定、かつ、信頼性の高い接続が得られる同軸コネクタを実現できる。

【0020】実施の形態2. 図4は、実施の形態2による同軸コネクタの構造を示す断面図である。図において、14は第1の外導体1の底部に設けられたねじ穴、15はプリント回路基板10に設けられ、ねじが貫通する穴、16はねじである。その他、図1と同一符号は、図1のものと同等あるいは相当するものを表す。前述の実施の形態1による同軸コネクタでは、第1の外導体1とプリント回路基板10の回路パターン11をはんだ付けすることによりプリント回路基板10に装着する構造のものを示したが、本実施の形態による同軸コネクタは、図4に示すように、第1の外導体1の底部において、その外周部に大きく張り出す棚状の突出部を設け、この棚状の張り出した突出部にねじ穴14を複数箇所設ける共に、この複数のねじ穴14にそれぞれ対応させてプリント回路基板10にも複数の穴15を設け、ねじ16により第1の外導体1とプリント回路基板10とをねじ止め固定することにより第1の外導体1とプリント回路基板10の回路パターン11とを接続することを特徴とする。

【0021】これにより、本実施の形態による同軸コネクタでも、中心導体ピン5は導電性を有した球状回転構造物7を介してプリント回路基板10上の回路パターン12に安定した状態で弾性接触しており、前述した実施の形態1による同軸コネクタと同様の効果を奏すると共に、さらに、はんだ付け作業が不要となるので、作業性の改善が図れる。

【0022】実施の形態3. 図5は、実施の形態3による同軸コネクタの構造を示す断面図である。図において、1aは略円筒形状をした第1の外導体1の内周面において棚状に突出して形成された第1の突出部、1bは第1の外導体1の底部近傍（即ち、第1の外導体1のプリント回路基板側端部の近傍）の内周部において棚状に突出して形成された第2の突出部である。また、3は円筒形状の第2の外導体であって、3aは第2の外導体3の外周部において棚状に突出して設けられた第3の突出部である。また、8は第1の外導体1の第1の突出部1aと第2の外導体3の第3の突出部3aとの間に配置された第1のスプリング（ばね）である。その他、実施の形態1による同軸コネクタの構造を示す図1と同一符号は、図1のものと同等あるいは相当のものを表す。

【0023】図5に示すように、中心導体ピン5および絶縁体2と一体構造となっている第2の外導体3の底部（即ち、第2の外導体のプリント回路基板側の端部）は、第1の外導体1の底部近傍の内周部に形成された第2の突出部1bにより支持されている。実施の形態1による同軸コネクタの場合と同様に、第1の外導体1はプリント回路基板10上の回路パターン11にはんだ13で固定接続され、中心導体ピン5は先端に取り付けられ

た球状回転構造物7を介してプリント回路基板10上の回路パターン12に弾性接触にて接続される。

【0024】次に、本実施の形態3による同軸コネクタの特徴的な構造および動作について説明する。中心導体ピン5の中央部は絶縁体2で保持される共に、絶縁体2の外周には略円筒形状の第2の外導体3が形成されており、第2の外導体3、絶縁体2および中心導体ピン5は一体構造となっている。そして、絶縁体2および中心導体ピン5と一体構造となっている第2の外導体3は、第1の外導体1の内部で第1のスプリング8の作用によって第2の外導体3の底部と第1の外導体1の第2の突出部1bの上面との間で弾性接触を保ちながら、第1の外導体1の第2の突出部1bで支持されており、プリント回路基板10に対して平行な方向に自在に移動できる構造となっている。

【0025】このような構造（即ち、中心導体ピン位置調整機構）を採用した本実施の形態による同軸コネクタでは、相手側同軸コネクタと嵌合する際に、相手方の同軸コネクタの位置がプリント回路基板10の基板表面と平行な方向に多少ずれても、第2の外導体3、絶縁体2および中心導体ピン5は一体となって、プリント回路基板10の基板表面と平行な方向に移動が可能であり、相手方の同軸コネクタと容易に嵌合することができる。また、その嵌合時に中心導体ピン5がプリント回路基板10の基板表面と平行な方向に動く際に、弾性を有した中心導体ピン5の先端には導電性を有した球状回転構造物7を備えているため、プリント回路基板10上の回路パターン12の表面を傷つけることなく、安定した接触を保ったまま中心導体ピン5はプリント回路基板10の基板表面と平行な方向に移動することができる。また、第2の外導体3がプリント回路基板10の基板表面と平行な方向に移動しても、第1の外導体1と第2の外導体3は常に弾性接触を保っているため、高周波信号の伝達特性変動のない安定した信頼性の高い接続が可能となる。

【0026】実施の形態4、図6は、実施の形態4による同軸コネクタの構造を示す断面図である。図において、1aは略円筒形状をした第1の外導体1の内周面において棚状に突出して設けられた第1の突出部、1bは第1の外導体1の底部近傍の内周部において棚状に突出して設けられた第2の突出部である。また、3は略円筒形状の第2の外導体であって、3aは第2の外導体3の外周部において棚状に突出して設けられた第3の突出部である。また、8は第1の外導体1の第1の突出部1aと第2の外導体3の第3の突出部3aとの間に配置された第1のスプリングである。また、51はその先端に導電性を有した球状回転構造物7が設けられている第1の中心導体ピン、52はプリント回路基板10の回路パターン12にはんだ接続されている第2の中心導体ピンである。その他、実施の形態3による同軸コネクタの構造を示す図5と同一符号は、図5のものと同等あるいは相

当のものを表す。

【0027】次に、本実施の形態による同軸コネクタの特徴的な構造および動作について説明する。第1の中心導体ピン51は、絶縁体2および第2の外導体3と一体構造となっており、その先端には球状回転構造物7が設けられている。また、第2の中心導体ピン52は、その一端はプリント回路基板10の回路パターン12にはんだ接続され、他端は第1の中心導体ピン51の先端に設けられた球状回転構造物7が接触接続されている。即ち、第1の中心導体ピン51と第2の中心導体ピン52は、第1の中心導体ピン51の先端に取り付けられた導電性を有した球状回転構造物7を介して弾性接触を保つ構造となっている。そして、実施の形態3の場合と同様に、絶縁体2および第1の中心導体ピン51と一体構造となっている第2の外導体3は、第1の外導体1内部で第1のスプリング8の作用によって第2の外導体3の底部と第1の外導体1の突出部1bの上面との間で弾性接触を保ちながら、プリント回路基板10の表面に対して平行な方向に自在に移動できる構造となっている。

【0028】このような構造を有した本実施の形態による同軸コネクタでは、嵌合する相手方の同軸コネクタの位置がプリント回路基板10の表面と平行な方向に多少ずれても、第2の外導体3、絶縁体2および第1の中心導体ピン51は一体となってプリント回路基板10の表面と平行な方向に移動し、相手方の同軸コネクタと嵌合することができる。また、その嵌合時に、第1の中心導体ピン51がプリント回路基板10の表面と平行な方向に動く際、第1の中心導体ピン51の先端には球状回転構造物7を設けているため、第2の中心導体ピン52と安定した接触を保ったまま第1の中心導体ピン51はプリント回路基板10の表面と平行な方向に移動できる。また、相手方の同軸コネクタと嵌合した際、第2の外導体3と一体構造となっている第1の中心導体ピン51がプリント回路基板10の表面と平行な方向に移動しても、第2の中心導体ピン52はプリント回路基板10の回路パターン12に固定接続されているので、第2の中心導体ピン52と第1の外導体1との間の距離は変わらず、実施の形態3の場合よりも高周波信号の伝達特性変動が少なくなり、さらに安定した信頼性の高い接続が可能となる。

【0029】発明の実施の形態5、図7は、実施の形態5による同軸コネクタの構造を示す断面図である。前述の実施の形態4による同軸コネクタでは、第1の中心導体ピン51の先端に球状回転構造物7を取り付けて第2の中心導体52と接触接続する構造のものを示したが、本実施の形態による同軸コネクタでは、第2の中心導体ピン52の先端に導電性を有した球状回転構造物7を取り付けて、垂直方向に弾性を有した第1の中心導体ピン51と接触接続させる構造としたものである。その他の構造は、実施の形態4に同軸コネクタと同じであるの

で、説明は省略する。本実施の形態による同軸コネクタも前述の実施の形態と同様の効果を奏することはいうまでもなく、また、第2の中心導体ピンの先端に球状回転構造物を取り付ける構造としたことにより、コネクタ内部の部品製作が容易になるという効果もある。

【0030】実施の形態6. 図8は、実施の形態6による同軸コネクタの構造を示す断面図である。図において、9は第1の外導体1の第2の突出部1aと第2の外導体3の底部との間に配置された第2のスプリングである。その他、実施の形態3による同軸コネクタの構造を示す図5と同一符号は、図5のものと同等あるいは相当のものを表す。

【0031】本実施の形態による同軸コネクタは、実施の形態3による同軸コネクタにおいて、さらに第1の外導体1の第2の突出部1aと第2の外導体3の底部との間に第2のスプリング9を設けることにより、嵌合時に図示されていない相手方の同軸コネクタが差し込まれると、一体構造となっている第2の外導体3、絶縁体2および中心導体ピン5が摩擦力により下方（プリント回路基板10に向かう方向）に押し下げられ、球状回転構造物7がプリント回路基板10の回路パターン12に接触し、さらに相手方の同軸コネクタを差し込むことにより、相手方の同軸コネクタと確実に嵌合する。また、相手方の同軸コネクタが嵌合していない時は、図8に示すように、球状回転構造物7と回路パターン12とは接触接続していない。

【0032】実施の形態3による同軸コネクタの場合には、第1の外導体1の第2の突出部1bと第2の外導体3の底部とは面接触していたが、本実施の形態による同軸コネクタにおいては、第1の外導体1の第2の突出部1bと第2の外導体3の底部との接触は第2のスプリング9のみであり、面接触はしていない。従って、相手方の同軸コネクタがプリント回路基板10の表面と平行な方向にずれている状態で嵌合する際の第1の外導体1の第2の突出部1bと第2の外導体3の底部との接触摩擦力は実施の形態3による同軸コネクタの場合に比べて小さくなり、嵌合がさらに容易に行える。

【0033】

【発明の効果】本発明に係る同軸コネクタによれば、回路基板にはんだ付けにより固定接続される略円筒状の第1の外導体と、第1の外導体の内部に配置され、外周に第2の外導体が形成された絶縁体によって中央部が保持された中心導体ピンとを備えた同軸コネクタにおいて、上記中心導体ピンは、弾性を有していると共に、回路基板側の先端に導電性を有した球状回転構造物が設けられ、回路基板に装着されたときに、球状回転構造物は回路基板の回路パターンと接触接続するように構成したので、中心導体ピンと回路パターンのはんだ接続におけるはんだ形状の差異に起因する高周波信号伝達特性の変動がなくなると共に、中心導体ピンの先端で回路パターン

の表面を傷つけることもなくなり、中心導体ピンと回路パターンとの間において、安定、かつ信頼性の高い接続が得られる。

【0034】また、本発明に係る同軸コネクタによれば、第1の外導体はねじ止めによって回路基板に固定接続されるので、中心導体ピンと回路パターンとの間において、安定、かつ信頼性の高い接続が得られると共に、さらに、はんだ付け作業が不要となり、作業性の改善が図れる。

【0035】また、本発明に係る同軸コネクタによれば、中心導体ピンを回路基板と平行な方向に自在に移動可能とする中心導体ピン位置調整機構を備えたので、中心導体ピンと回路パターンとの間において、安定、かつ信頼性の高い接続が得られると共に、相手方の同軸コネクタの位置が多少ずれても相手方の同軸コネクタと容易に嵌合することができる。

【0036】また、本発明に係る同軸コネクタによれば、中心導体ピン位置調整機構は、第1の外導体の内周面において棚状に突出して形成された第1の突出部と、第1の外導体の回路基板側端面近傍の内周面において棚状に突出して形成された第2の突出部と、第2の外導体の外周面において棚状に突出して形成された第3の突出部とを設け、第1の外導体の第1の突出部と第2の外導体の第3の突出部との間に第1のスプリングを配置して、第1の外導体の第2の突出部に第2の外導体の回路基板側の端面を接触させると共に、第1の外導体の第2の突出部により第2の外導体を移動可能に支持したので、中心導体ピン位置調整機構を簡単な構造によって実現でき、中心導体ピンと回路パターンとの間において、安定、かつ信頼性の高い接続が得られると共に、相手方の同軸コネクタの位置が多少ずれても相手方の同軸コネクタと容易に嵌合することができる。

【0037】また、本発明に係る同軸コネクタによれば、中心導体ピンは、絶縁体に中央部が保持され、回路基板側の先端に球状回転構造物が設けられた第1の中心導体ピンと、回路基板の回路パターンに一端が固定接続される共に、他端は上記球状回転構造物が接触接続している第2の中心導体ピンとで構成されたので、相手方の同軸コネクタと嵌合して第1の中心導体ピンの位置が多少移動しても、第2の中心導体ピンと第1の外導体との間の距離は変わらず、高周波信号の伝達特性変動が少なくなり、さらに安定した信頼性の高い接続が可能となる。

【0038】また、本発明に係る同軸コネクタによれば、球状回転構造物は、第2の中心導体ピンの先端に設けられたので、第2の中心導体ピンと第1の外導体との間の距離は変わらず、安定した信頼性の高い接続が可能となると共に、コネクタ内部の部品製作が容易になる。

【0039】また、本発明に係る同軸コネクタによれば、第2の外導体の上記回路基板側の端面と第1の外導

体の上記回路基板側端部近傍の内周面において棚状に突出して形成された第2の突出部との間に第2のスプリングをさらに配置したので、第1の外導体の第2の突出部と第2の外導体3の底部との接触摩擦力は小さくなり、嵌合がさらに容易に行える。

【図面の簡単な説明】

【図1】 実施の形態1による同軸コネクタの構造を示す断面図である。

【図2】 嵌合する相手方同軸コネクタの構造例を示す断面図である。

【図3】 実施の形態1による同軸コネクタが相手方の同軸コネクタと嵌合したときの状態を示す断面図である。

【図4】 実施の形態2による同軸コネクタの構造を示す断面図である。

【図5】 実施の形態3による同軸コネクタの構造を示す断面図である。

【図6】 実施の形態4による同軸コネクタの構造を示す断面図である。

【図7】 実施の形態5による同軸コネクタの構造を示す断面図である。

す断面図である。

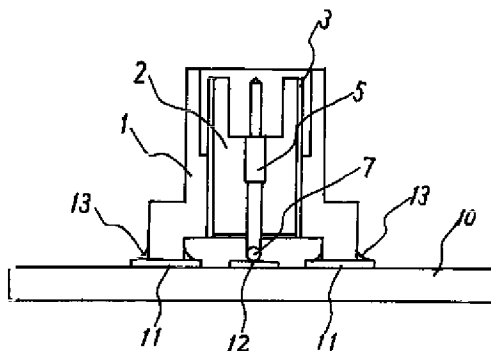
【図8】 実施の形態6による同軸コネクタの構造を示す断面図である。

【図9】 従来の同軸コネクタの構造を示す断面図である。

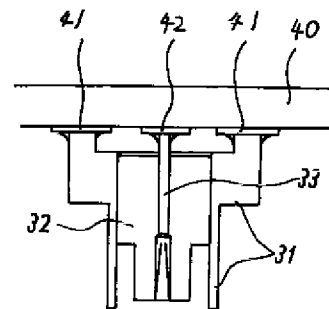
【符号の説明】

- | | |
|-----------------------|--------------|
| 1 第1の外導体 | 1 a 第1の突出部 |
| 1 b 第2の突出部 | 2 絶縁体 |
| 3 第2の外導体 | 3 a 第3の突出部 |
| 5 中心導体ピン | 7 球状回転構造物 |
| 8 第1のスプリング | 9 第2のスプリング |
| 10 プリント回路基板 | |
| 11 第1の外導体が接続される回路パターン | |
| 12 第2の外導体が接続される回路パターン | |
| 13 はんだ | 14 ねじ穴 |
| 15 プリント回路基板の穴 | 16 ねじ |
| 51 第1の中心導体ピン | 51 第2の中心導体ピン |

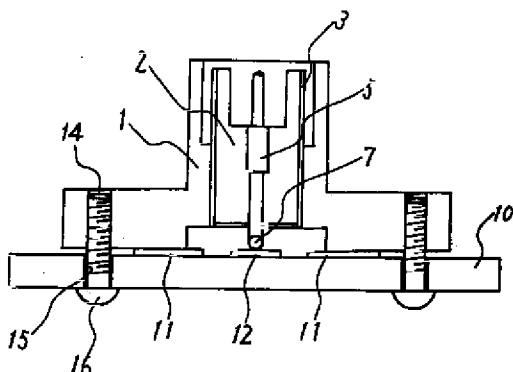
【図1】



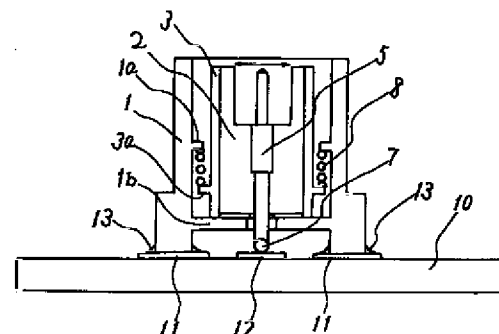
【図2】



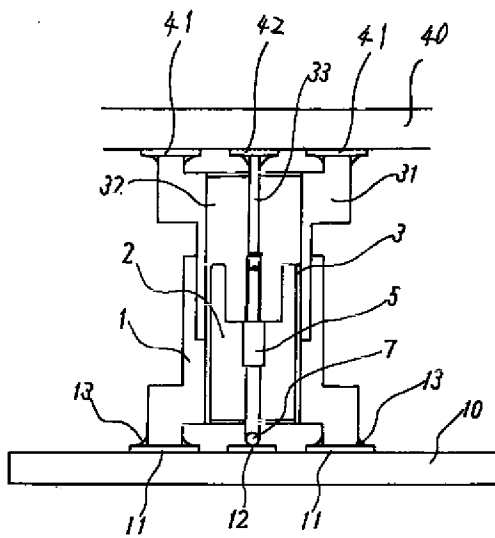
【図4】



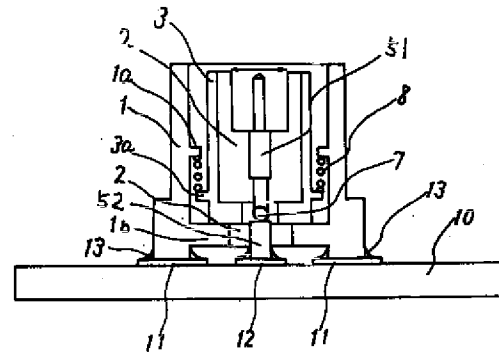
【図5】



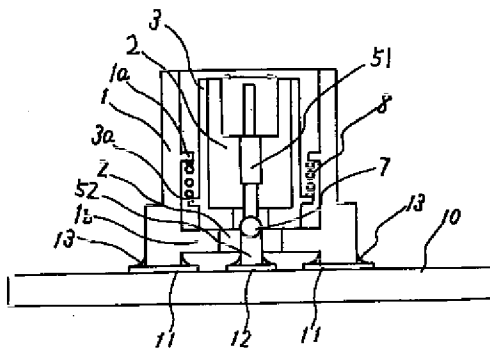
【図3】



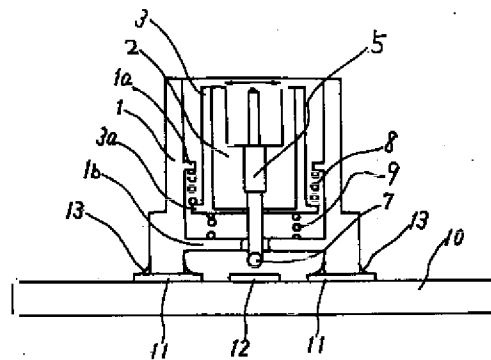
【図6】



【図7】



【図8】



【図9】

